

CALIFORNIA COASTAL COMMISSION

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Supporting Document No. 7



May 6, 2009

San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

RE: Proposed Order No. R9-2006-0065 / NPDES No. CA0109223 for Poseidon Resources Corporation Carlsbad Desalination Project

VIA FACSIMILE: (858) 571-6972 and EMAIL: RB9agenda@waterboards.ca.gov

Dear Chair Wright and Board Members:

We appreciate the opportunity to comment on the proposed Order and to coordinate with you and your staff on this important project. We understand the Board may be making a decision at its upcoming meeting based in part on information Poseidon recently provided to you about its proposed facility and about the mitigation plan approved by the Coastal Commission. Parts of that information appear to be incorrect, and key portions of Poseidon's recent submittals for the Board's May 13, 2009 hearing are based on these apparent inaccuracies. This letter focuses on correcting the record before you on two main issues:

- 1) **Change in Project Description – Increased Intake Velocities:** Poseidon has changed its project description so that its expected intake velocities during both standalone and co-located operations are above the velocity range reviewed by the Coastal Commission. The higher velocities, and the higher adverse impingement impacts that accompany them, require Poseidon to return to the Commission for further action on its coastal development permit.
- 2) **Need For Additional Mitigation:** Poseidon has incorrectly characterized the Coastal Commission-approved Marine Life Mitigation Plan (MLMP) as being adequate to mitigate for its recently identified higher adverse impingement impacts. The MLMP as approved by the Commission does not include mitigation for these additional impacts. Further, Poseidon's recent proposals to you regarding the Tentative Order would not adequately modify the MLMP to provide sufficient mitigation for these impacts. We expect the Commission will consider requiring additional mitigation in the MLMP as part of its upcoming review of Poseidon's permit.

We have asked Poseidon to submit an application to amend its permit to address these issues.¹ We expect that a prompt and complete reply by Poseidon will not unduly delay your decision on the project; however, we are concerned that unless these inaccuracies are corrected, the Board

¹ We understand the City of Carlsbad is reviewing a proposed change to the project that would re-orient the facility at the project site. We anticipate handling that change as part of the permit amendment needed to address these intake velocity and impingement-related issues.

may inadvertently adopt a decision that may not be consistent with the Commission's approved Findings and MLMP. It could also result in contradictory requirements that would prevent Poseidon (or any other entity that may take on its mitigation obligations) from meeting the required mitigation performance standards.

1) Change in Project Description – Increased Intake Velocities: Poseidon's recent submittals to the Board describe a change in the project – i.e., an increase in intake velocities – that will require additional action by the Coastal Commission. We have asked that Poseidon submit with its application updated intake velocity calculations and additional proposed mitigation to address the increased impingement effects.

During the Commission's review, both Poseidon and the project's Environmental Impact Report (EIR) stated that Poseidon's use of 304 million gallons per day of seawater would cause intake velocities of 0.5 feet per second or less, which is the velocity range considered "best available technology" by the U.S. EPA. The Commission relied on characterizations by Poseidon and in the EIR in approving the project and in determining what mitigation requirements were needed for the project to conform to Coastal Act policies.²

As it turns out, the characterizations made both by Poseidon and in the project EIR regarding intake velocity are incorrect. As shown in a Poseidon January 2009 submittal to the Board,³ it is physically impossible for Poseidon (and/or the power plant operator) to pump 304 million gallons per day through the intake at velocities of 0.5 feet per second or less. The actual velocities at the intake bar racks range from about 40% to more than 250% higher than the originally stated 0.5 feet per second (i.e., from a minimum of no less than 0.7 feet per second to an as-of-yet undetermined maximum that would be several times higher).⁴

This change in the project appears to relate to the recently identified rate of impingement that is substantially higher than previously disclosed and is higher than reviewed by the Commission. The higher impact rates are based on updated impingement calculations Poseidon and Board staff have developed during the past two months. During the Commission's review, the expected impingement rate was about 0.96 kilograms per day of fish, but the expected impingement rates

² Poseidon stated in its April 6, 2009 letter to the Board that "Poseidon has remained consistent that the Project's intake water flows would be 0.5 fps or less at the Project intake's bar racks". Poseidon also stated in that letter that this velocity range "is consistent with U.S. EPA's 'best available technology' guidance for cooling water intakes". This April 6th letter also refers to Poseidon's November 7, 2007 statement to the Coastal Commission that "Poseidon has documented that the velocity of the water at the entrance to the bar racks is below 0.5 feet per second." Poseidon further confirmed in its letter that the Commission relied on Poseidon's characterization when it concluded in the Commission's permit findings that "Poseidon has documented that stand-alone operation of the facility would result in intake water velocities at or below 0.5 feet per second".

³ See Poseidon's January 26, 2009 submittal of the "Clean Water Act Section 316(b) Impingement Mortality and Entrainment Characterization Study: Effects on the Biological Resources of Agua Hedionda Lagoon and the Nearshore Ocean Environment", prepared by Tenera Environmental for Cabrillo Power LLC, January 2008.

⁴ See Attachment 1 to this letter, which provides a range of velocities under expected conditions.

are now higher by about 60% to 750% (depending on which calculations are used).⁵ These impingement rates exceed the range determined by the Commission to be *de minimis* and represent an impact of up to almost three tons of fish per year, which Poseidon and others have calculated will require more than 11 acres of mitigation area to offset. As part of its upcoming review, we expect the Commission will evaluate the updated velocity calculations and impingement rates and then independently determine the appropriate basis for any additional mitigation (see below). This review will ensure the project remains in conformity with Coastal Act policies and will likely result in a change to the Commission's previously-approved MLMP.

2) Need For Additional Mitigation: Poseidon submitted documentation for your April and May hearings stating that it expects to mitigate for its recently identified higher impingement rate by using "excess" production at the mitigation site(s) required through the Commission's MLMP. Its April 30, 2009 submittal for your May hearing proposes "crediting" various proportions of fish produced in its eventual mitigation site(s) towards Poseidon's higher impingement impacts.

However, the MLMP approved by the Commission does not include "excess" production and does not provide for "crediting" mitigation towards an impact that the Commission was not informed about and that was not included in its deliberations. The Commission's review focused on determining how large an area would be needed to provide sufficient habitat for producing the larvae lost to entrainment. The Commission's MLMP approval was based primarily on mitigating the project's entrainment impacts, along with a relatively small amount of impingement impacts (i.e., the above-referenced 0.96 kilograms of fish per day).⁶ The approved MLMP is expected to provide 80% certainty that it will fully mitigate for all entrainment impacts. At best, the Commission-approved MLMP could provide mitigation credit for up to 0.96 kilograms per day of impingement. Poseidon's proposed "crediting" approach for impingement impacts is not consistent with the Commission's approval and will require additional Commission review and action.

We expect the Commission's review will rely in part on recommendations from members of a Science Advisory Panel the Commission convened to provide independent assessment of another similar wetland mitigation project in the San Diego region and that the Commission relied on last

⁵ Regarding the 0.96 kilograms per day rate, the Commission during its review was aware of one correction Poseidon made – in its conversion from kilograms to pounds, Poseidon had originally calculated 0.96 kilograms as being equal to 1.96 pounds and then corrected it to 2.1 pounds. However, this correction did not change the impingement rate from 0.96 kilograms per day.

⁶ See, for example, the Commission's December 2008 Condition Compliance Findings for the MLMP, which state: "The Commission determined that Poseidon's entrainment impacts resulted in a loss of marine organisms equivalent to that produced in a 55.4-acre area of estuarine and nearshore habitat"; that requiring 55.4 acres of estuarine wetland mitigation "provides a sufficient degree of certainty that the facility's entrainment impacts will be fully mitigated"; and, that "implementation of the Plan will ensure the project's entrainment-related impacts will be fully mitigated." [emphasis added.]

year during its review of Poseidon's mitigation proposal.⁷ In approving the MLMP, the Commission relied on Panel member recommendations regarding the type of mitigation needed to address Poseidon's entrainment impacts and adopted Panel member Dr. Pete Raimondi's recommended 80% certainty level (instead of Poseidon's suggested 50% level) and his recommended 55.4 acres of mitigation acreage (instead of Poseidon's suggested 37 acres). To be consistent with the Commission's previous findings and MLMP approval, we expect to have the Panel conduct a similar review of Poseidon's updated impingement levels and proposed mitigation approach as part of the upcoming review of Poseidon's permit amendment.

We are also concerned about Poseidon's latest submittals to the Board with suggested measures for sampling and monitoring impingement rates and impingement mitigation. Poseidon proposes monitoring focused largely on determining fish biomass, but as Poseidon and others have noted, mitigation needed for impingement effects should take the form of fish productivity, which requires a substantially more involved and complex approach than monitoring for biomass. Poseidon's proposed monitoring conditions are not likely to provide the data needed to determine whether its eventual mitigation site(s) is capable of, and actually produces, the necessary amount of fish. We note, too, that Poseidon's proposals would have its own consultants determine necessary monitoring and sampling measures; however, this would not provide the level of independent peer review and confirmation that the Commission relied on in approving the MLMP. The Commission's Science Advisory Panel has already developed rigorous monitoring methodologies that are completely consistent with the scientific literature, and we expect the Commission will likely rely on the Panel to review Poseidon's proposed monitoring approach for adequacy and to ensure consistency with the existing MLMP monitoring requirements that the Panel developed. Please note, too, that changes the Board might make to the MLMP will require Commission concurrence – for example, if the Board requires Poseidon to conduct additional monitoring, the Commission will evaluate whether Poseidon will need to provide additional funds to support that monitoring.

Closing: In sum, Poseidon has changed its project in a way that will require additional Commission review and has proposed a mitigation approach that is not consistent with its current Commission approval. Additionally, as noted above, we are concerned that Poseidon's proposed Order, if adopted by the Board, may result in nonconformity with the Commission's approved MLMP and may result in mitigation site(s) that cannot meet the performance standards required of Poseidon (or of any other entity that may take on the mitigation obligations).

⁷ The Panel is a team of independent scientists that provides guidance and oversight to the Commission on ecological issues associated with the San Dieguito Restoration Project. The Panel also reviewed Poseidon's entrainment study last year and made recommendations to the Commission regarding necessary mitigation. The Panel includes *Dr. Richard Ambrose*, Professor and Director of Environmental Science & Engineering Program, Department of Environmental Health Sciences, University of California Los Angeles; *Dr. John Dixon*, Senior Ecologist, California Coastal Commission; *Dr. Mark Page*, Marine Science Institute, University of California at Santa Barbara; *Dr. Pete Raimondi*, Professor and Chair of Ecology and Evolutionary Biology, University of California at Santa Cruz; *Dr. Dan Reed*, Marine Science Institute, University of California at Santa Barbara; *Dr. Steve Schroeter*, Marine Science Institute, University of California at Santa Barbara; and, *Dr. Russ Schmitt*, Director of Coastal Research Center, University of California at Santa Barbara.

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To conclude, we request the Board incorporate the corrected information provided herein in its consideration of the proposed Tentative Order. Regardless of the Board's action, Poseidon will need to return to the Commission for additional review and action. We anticipate coordinating with you and your staff as the Commission continues its review of the project.

Sincerely,



Peter M. Douglas
Executive Director

cc: Poseidon Resources – Peter MacLaggan
San Diego Regional Water Quality Control Board – John Robertus
California State Lands Commission – Paul Thayer
City of Carlsbad – Scott Donnell

**Comments to Regional Board re: Poseidon Resources Tentative Order No. R9-2006-0065
and NPDES No. CA109223 – May 6, 2009**

ATTACHMENT 1

**IMPINGEMENT VELOCITIES AT POSEIDON / ENCINA INTAKE
FOR 304 MILLION GALLON PER DAY SEAWATER USE**

Summary: Based on information Poseidon provided to the Regional Board in January 2009,¹ pumping 304 million gallons per day of seawater through the Encina intake (by either Poseidon or the power plant operator) will always result in velocities higher than 0.5 feet per second at the intake trash racks.

Calculations and Dimensions Used: The calculations below are based on fundamental flow equation $Q = av$, where Q = discharge (or intake volume) in cubic feet per second, a = cross-section of intake in square feet, and v = velocity in feet per second. The equation illustrates the relationship that the larger an intake cross-section, the lower the velocity for a given intake volume. All calculations use a Q of 304 million gallons per day, which is equal to 470 cubic feet per second. The intake dimensions are from the document cited above, which shows the intake consists of four sections ten feet wide and 23.5 feet high. The intake is covered with trash rack bars approximately one inch wide and separated by gaps of about three-and-a-half inches. The tidal range at the intake is approximately +7.2 MLLW to -2.1 MLLW, and at 0.0 MLLW, the intake depth is about 12.3 feet.

Calculating Intake Velocities Under Expected Conditions: If the full cross-section of the intake was available (i.e., if the intake was completely underwater), the lowest possible velocity would be: $Q = 470$ cfs; $a = 940$ square feet, so $Q = av$ results in a velocity of 0.5 feet per second.

However, several intake characteristics act to increase the actual velocities:

- The top of the intake is above the usual tidal range of the lagoon, so the full intake cross-section is rarely, if ever, completely underwater, so velocities are higher than the theoretical minimum shown above. Calculated velocities at different tidal heights are provided below.
- Trash racks occupy part of the intake opening, thereby reducing the cross-section and increasing velocities. The calculations below assume the area occupied by trash rack bars reduce the intake width by fifteen percent (i.e., a 1-inch bar every 3.5 inches along a 40-foot width represents about a 16.5% reduction, which is rounded in the calculations to 15%). The useable intake width is therefore about 34 feet (40' X 0.85)
- The bottom of the intake is subject to sedimentation and the trash racks are subject to fouling with vegetation, both of which further reduce the cross-sectional area and increase velocities. The calculations below do not include these factors, so the actual intake velocities will be higher than shown below when the intake is fouled with sediment or vegetation.

¹ See "Clean Water Act Section 316(b) Impingement Mortality and Entrainment Characterization Study: Effects on the Biological Resources of Agua Hedionda Lagoon and the Nearshore Ocean Environment", prepared by Tenera Environmental for Cabrillo Power LLC, January 2008, provided by Poseidon to the Regional Board on January 26, 2009.

- Velocities against the trash racks will be higher during incoming tides or with a current coming from the north (however, because the pull of the intake pumps would remain constant, velocities will not be reduced due to outgoing tides). The calculations below do not include these higher velocities.
- The intake structure creates turbulence, which can result in higher or lower velocities in some areas of the intake. The calculations below do not consider turbulence.

During high tides (lowest expected velocity): High tides in Agua Hedionda range around +7.2 MLLW. At that water level, the wetted cross-section of the intake would be 19.5 feet deep by 34 feet wide, or about 663 square feet.

Solving for velocity: $Q = 470$ cfs; $a = 663$ square feet, so $Q = av$ results in a velocity of **0.71** feet per second.

Near the midpoint of the tidal cycle: At 0.0 MLLW, the wetted cross-section of the intake is 12.3 feet deep by 34 feet wide, which equals about 418.2 square feet.

Solving for velocity: $Q = 470$ cfs; $a = 418.2$ square feet, so $Q = av$ results in a velocity of **1.12** feet per second.

During low tides: Low tides in Agua Hedionda are approximately -2.1 MLLW. At that water level, the wetted cross section of the intake is 10.2 feet deep by 34 feet wide, which equals about 346.8 square feet.

Solving for velocity: $Q = 470$ cfs; $a = 346.8$ square feet, so $Q = av$ results in a velocity of **1.36** feet per second.

Conclusion: The velocities in all cases will exceed the EPA “best available technology” range of up to 0.5 feet per second. As noted above, the calculations do not include sedimentation, fouling, or effects of an incoming tide or current, all of which would result in higher velocities.